

# Dental Anthropology

A PUBLICATION OF  
THE DENTAL ANTHROPOLOGY ASSOCIATION

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Volume 13, Number 1, 1998

ISSN 1096-9411

## LOSS OF LINGUAL ENAMEL IN LOWER INCISORS OF PAPIONINI

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### INTRODUCTION

The reduction or even the absence of lingual enamel in *Papio* was first observed by Noble (1969). Noble (1969) noted that the lingual aspect of the lower incisors of *Papio* appears to be incompletely covered by enamel and that the enamel was very thin. Later, Delson (1975) described the anterior dentition of papionins to be most distinctive, in that the lower incisors are characterized by the apparent lack of enamel on the lingual surfaces, effectively producing a self-sharpening, nearly rodent-like chisel edge on these teeth (Szalay and Delson, 1979:333). However, Swindler (1976:138) in a study of the lower incisors of *Papio*, *Cercocebus*, *Macaca*, and *Theropithecus* stated, "in our opinion, their lingual surfaces possess a thin layer of enamel, and therefore we cannot agree with Delson's observations."

Furthermore, Gantt's (1977) histological study of enamel thickness in the anterior dentition of nonhuman primates revealed the presence of lingual enamel in the lower incisors of cercopithecines. Gantt measured the thickness of enamel in 39 incisors from four cercopithecines, including *Papio*, and three colobine genera, and reported the presence of a lingual layer of enamel in the lower incisor of *Papio anubis* and *Macaca nemestrina*.

Shellis and Hiimae (1986) attempted to resolve this controversy by conducting a histological study of enamel thickness on 20 erupted unworn or slightly worn central lower incisors from five cercopithecine and two colobine genera. They reported that the lower incisors of the colobine monkeys had a substantial layer of enamel on both lingual and labial aspects, while the cercopithecines and papionins had little or no enamel on the lingual aspects. This led Strasser and Delson (1987) to interpret their findings to document that cercopithecines, especially the papionins, have eliminated the lingual layer of enamel. The suggestion that cercopithecines have "eliminated the lingual layer of enamel" requires a major change in tooth morphogenesis, which has yet to be verified, and would represent a major developmental difference between the Cercopithecinae and the Colobinae.

### PURPOSE/METHODS

This investigation was conducted to determine the presence or absence of lingual enamel in the Papionini. Accomplishing this necessitated obtaining unerupted mandibular incisors, thereby eliminating any artifact due to wear or fracturing of the enamel from erupted teeth. Lower jaws were obtained from *Papio anubis* (N=2), *Macaca mulatta* (N=5), *Macaca nemestrina* (N=3), and *Macaca fascicularis* (N=2). Both central and lateral mandibular incisors were extracted and soft tissues removed.

### RESULTS

Thin section analysis (Gantt, 1986) and Scanning Electron Microscope analysis (Fig. 1) demonstrate the lack of lingual enamel in these primate species. Analysis of all unerupted incisors revealed an absence of lingual enamel as is clearly evident in Fig.1. These data definitely support the Strasser and Delson (1987) conclusions on the significance of the lingual enamel in the Papionini. This finding has important implications for primate ontogeny and phylogeny. This absence represents a major change in amelogenesis, resulting in the loss of lingual enamel in the lower incisors, while the upper incisors retain a thin layer of lingual enamel. A detailed study of enamel thickness in the anterior

## LOSS OF LINGUAL ENAMEL

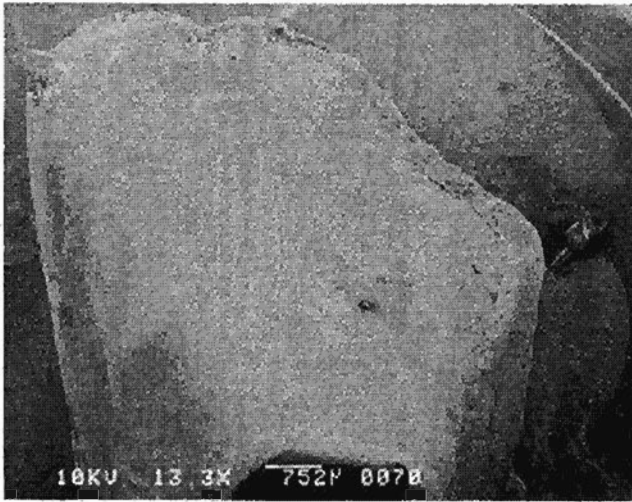


Fig. 1. Mandibular right lateral incisor of *Papio anubis*, age 18 months.

dentition of the Cercopithecidae is presently underway and will elucidate in more detail differences among the subfamilies, Cercopithecinae and Colobinae.

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## DENTAL HEALTH AND DIET OF TWO PREHISTORIC POPULATIONS FROM CHILE'S SEMIARID NORTH

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**ABSTRACT** This investigation examines dental health and diet of two prehistoric populations from Chile's semiarid north. Trace element and dental paleopathological analyses have been conducted on skeletal remains of hunter-gatherers of the Archaic period (n = 99, ca. 1,800 BC) and agriculturalists of the Diaguita period (n = 82, 1,000-1,500 AD). Archaeological and historical evidence indicates that the Diaguita diet primarily incorporated cultivated and wild plants, but also included pastoralism and marine resources. By contrast, the subsistence of Archaic peoples was primarily based on marine resources. Concentration values of the elements strontium and barium (mean log ratio values for Archaic = -0.7985, n=38; for Diaguita = -0.5475, n= 53) support the archaeological evidence for subsistence mode, and thus for diet, of both populations. These concentrations fall within the ranges determined for various archaeological New World populations with similar subsistence and dietary patterns.

Based on the differences in subsistence and diet, the variations in dental health between the two populations were investigated. The analysis to date has revealed that both populations suffered from infectious (antemortem tooth loss, abscesses, caries, alveolar recession), degenerative (calculus deposition), and developmental (enamel hypoplasia) dental pathologies. The differences in frequencies of some of the infection processes are statistically significant between the two populations (p <0.05), but overall do not seem to demonstrate, as many other studies have (Larsen, 1984; Schmucker, 1985; Murphy, 1993), a sharp decline in dental health from the hunter-gatherer population.

### INTRODUCTION

This investigation examines the impact on health resulting from the transition to and adoption of farming in the semiarid north of Chile. A large body of paleopathological evidence (Cohen, 1977, 1989; Cohen and Armelagos, 1984; Larsen, 1984; Schmucker, 1985; Swedlund and Armelagos, 1990; Stuart-Macadam, 1989; Murphy, 1993) supports an accepted model for biological adaptation which states that the adoption of farming and concomitant sedentism, despite a positive effect these may have on population growth, may in fact have negative effects on health and life expectancy.